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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/802,375	03/09/2001	Nazir Ahmad	CPAC 1002-1US	8400

22470 7590 01/28/2003

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EXAMINER

VU, QUANG D

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 01/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/802,375

Applicant(s)

AHMAD ET AL.

Examiner

Quang D Vu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on amendment filed on 11/18/02.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 1-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

Claim 14 is objected to because of the following informalities: In line 2, the phrase "...a chip having a bumps formed..." should be change to "...a chip having bumps formed...". Appropriate correction is required.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 14-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 14, in lines 4-5, the phrase "...the material of the interconnect contact" is unclear. It is being referred ^{to} the material of the metallization?

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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2. Claims 14 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No. 5,346,857 to Scharr et al.

Regarding claim 14, Scharr et al. (figure 2) teach a chip (26) having bumps (28) formed thereon and a substrate (21) having interconnect points on a metallization (23) thereon, the bumps (28) forming contacts with the interconnect points, wherein an alloy (a region indicated by line [29]) is formed at an interface between the material of each bump (28) and the material of the metallization (23) in contact with the bump (28) (see figure 2; column 3, line 54 – column 4, line 16).

Regarding claim 16, Scharr et al. teach the bump (28) material comprises gold and the interconnect points (metallization [23]) comprise Sn, and the alloy (a region indicated by line [29]) at the interface comprises a Au/Sn alloy (see figure 2; column 3, line 54 – column 4, line 16).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 5,346,857 to Scharr et al. in view of US Patent No. 6,326,234 to Nakamura.

Regarding claim 15, Scharr et al. do not teach a cured adhesive polymer is situated in a middle region between the bump surface of the chip and the surface of the substrate.

However, Nakamura teaches an adhesive polymer (7) is situated in a middle region

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between the bump surface of the chip (1) and the surface of the substrate (2) (see figure 4). Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to incorporate the teaching of Nakamura into the device taught by Scharr et al. because it provides good adhesion between the chip and the substrate.

5. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 5,346,857 to Scharr et al.

Regarding claim 17, Scharr et al. do not explicitly teach the alloy at the interface is 20:80 Sn:Au alloy. It would have been obvious to one having ordinary skill in the art at the time the invention was made for an alloy at the interface is 20:80 Sn:Au alloy, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Response to Arguments

Applicant's arguments filed 11/18/02 have been fully considered but they are not persuasive.

It is argued, in page 3 of the remarks, that the examiner has not shown how the alternative process would constitute "a materially different process". Since the chip can be aligned with the substrate before providing the polymer adhesive, it has shown that there is an alternative process to make applicant's device. Therefore, the alternative process mentioned by the examiner is a materially different process.

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It is argued, in page 3 of the remarks, that Scharr et al. do not teach or suggest an alloy is formed at an interface. This argument is not convincing because Scharr et al. teach an alloy (a region indicated by line [29]) is formed at an interface between the bump (28) and the material of the metallization (23) (see figure 2).

It is argued, in page 3 of the remarks, that Scharr et al. do not teach or suggest a gold tin eutectic alloy because the gold tin alloy cannot formed at a temperature below approximately 280 °C. This argument is not convincing because Scharr et al. teach a gold-tin eutectic alloy is formed at a temperature ranging between approximately 280 °C and 315 °C (column 3, lines 24-33).

It is argued, in page 4 of the remarks, that Scharr et al. do not teach or suggest an alloy at an interface between the bump material and the interconnect point and Nakamura can not supply what Scharr lacks. This argument is not convincing because Scharr et al. teach an alloy (a region indicated by line [29]) is formed at an interface between the bump material (28) and the metallization (23). The combined device of Scharr et al. and Nakamura shows the claimed subject matter of claim 15.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quang D Vu whose telephone number is 703-305-3826. The examiner can normally be reached on Monday-Friday.

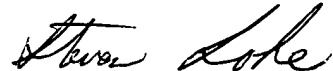
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for

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the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

qv
January 24, 2003

A handwritten signature in cursive script, appearing to read "Steven Loh".